UNITED STATES PATENT AND TRADEMARK OFFICE

UNITED STATES DEPARTMENT OF COMMERCE
United States Patent and Trademark Office
Address: COMMISSIONER FOR PATENTS
P.O. Box 1450
Alexandria, Virginia 22313-1450
www.uspto.gov

APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/688,243	10/17/2003	John A. Schield	194-25141-USD	2491

24923 7590 05/20/2004

PAUL S MADAN
MADAN, MOSSMAN & SRIRAM, PC
2603 AUGUSTA, SUITE 700
HOUSTON, TX 77057-1130

EXAMINER	
HERTZOG, ARDITH E	

ART UNIT	PAPER NUMBER
1754	

DATE MAILED: 05/20/2004

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary	Application No.	Applicant(s)	
	10/688,243	SCHIELD ET AL.	
	Examiner	Art Unit	
	Ardith E. Hertzog	1754	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *10/17/03 & 2/16/04*.

2a)☐ This action is **FINAL**. 2b)☒ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *11-20* is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *11-20* is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☒ The specification is objected to by the Examiner.

10)☐ The drawing(s) filed on _____ is/are: a)☐ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☐ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☒ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☒ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08) Paper No(s)/Mail Date *10172003*.
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____.
5) ☐ Notice of Informal Patent Application (PTO-152)
6) ☐ Other: _____.

DETAILED ACTION

Priority/Response to Amendment

1. This application is a division(al) of parent application 09/975,438, filed October 9, 2001, now US 6,656,445, which claims domestic priority under 35 U.S.C. § 119(e) based upon provisional application 60/240,140, filed October 13, 2000. Applicant's preliminary amendments filed October 17, 2003 and February 16, 2004 have been entered, and claims 11-20, as amended, are now pending.

Specification

2. The specification is objected to as failing to provide proper antecedent basis for the claimed subject matter. See 37 CFR § 1.75(d)(1) and MPEP § 608.01(o). Note that in claim 13, the "polyhydric alcohol moieties" of formula (II) are recited as "having 1 to 12 carbon atoms", while in the corresponding portion of the specification, they are recited as "having 1 to 60 carbon atoms, preferably 1-30 carbon atoms" (see p. 5, lines 18-19). It appears that this portion of the specification and/or claim 13 should be revised for consistency. Appropriate correction is required.

Minor Informalities

3. The disclosure is objected to, because of the following minor informalities:

   a. The "Cross-References to Related Applications" paragraph (added in the preliminary amendment filed October 17, 2003) is written incorrectly. The following language is suggested: "This application is a divisional of U.S.

Application Serial No. 09/975,438 filed October 9, 2001, now US 6,656,445 B2, which claims priority under 35 U.S.C. § 119(e) of U.S. Provisional Application No. 60/240,140 filed October 13, 2000."

b. In paragraph **[0022]**, as amended February 16, 2004, "(*e.g.* polymerized through the R6 group)" should evidently be "(*e.g.* polymerized through the R^8 group)".

Appropriate correction of both the above is required.

Claim Rejections - 35 U.S.C. § 112

4. The following is a quotation of the second paragraph of 35 U.S.C. § 112:

> The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.

5. Claims 11-20 are rejected under 35 U.S.C. § 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention. Said claims are considered vague, indefinite, and/or confusing, because the "contact temperature" limitation recited in independent claim 11 (claims 12-19 dependent thereon) and independent claim 20 is not understood in these **composition** claims. Specifically, it is not clear what is meant by "where the scavenging agent is in liquid form at contact temperature", given that there is no reference (implicit or explicit) to such "contact temperature" earlier in either **composition** claim 11 or **composition** claim 20. Claims 17 and 18, though clearly in product-by-process claim form, are still considered confusing, given their use of the past

tense "was" (replacing "was" with "is" in both claims 17 and 18 would overcome this aspect of this rejection). Appropriate correction is required.

Claim Rejections - 35 U.S.C. §§ 102 & 103

6. The following is a quotation of the appropriate paragraphs of 35 U.S.C. § 102 that form the basis for the rejections under this section made in this Office action:

> A person shall be entitled to a patent unless –
> (b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

7. The following is a quotation of 35 U.S.C. § 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

8. Claims 11-16, 19 and 20 are rejected under 35 U.S.C. § 102(b) as being anticipated by Roof (US 5,552,060). Roof teaches abatement of hydrogen sulfide with epoxides, **exemplifying** several compositions reading upon these claims of applicant, as now broadly recited therein (see Roof abstract & Examples 2, 4, 6-8 and 11). In particular, each Roof inventive example in Examples 2, 4, 6-8 and 11 shows a bottle comprising "hydrogen sulfide laden residual fuel oil (#6 oil)" that has been injected with one of the preferred Roof epoxides—styrene oxide, 1-3-butadiene diepoxide, or cyclohexene oxide (i.e., epoxides clearly within the scope of instant claims 11, 13-16, 19 and 20, as well as reading upon formula (II) of instant claim 12)—then stored in an oven at 121° C (see, for example, Roof Example 2, noting also col. 4, lines 11-13, 22-23). As

121° C is clearly at or above the melting point of sulfur (120° C), Roof thus exemplifies compositions containing "molten sulfur contaminated with at least one sulfhydryl compound" (i.e., applicant's component a), as broadly recited in both independent claims 11 and 20), in concert with effective amounts of epoxide scavenging agents reading upon applicant's formula (II); note that Roof clearly teaches molar ratios of scavenging agent to sulfhydryl compound ("proportional" or 1:1) which fall within the scope of applicant's claim 20 range (see col. 3, lines 63-65). Also, as Roof reports no color change for any of these exemplary compositions, the "molten sulfur" is evidently "not discolored", as required by instant claim 19. Accordingly, Roof **anticipates** instant **composition** claims 11-16, 19 and 20, since **compositions** meeting all required limitations thereof are exemplified (note that instant claims 13-16 simply recite structural formula limitations for applicant's non-epoxide scavenging agents **if present**; that is, they do not **require** that the scavenging agent be anything other than one of applicant's component b) species, as recited in independent claim 11). It **is** appreciated that these Roof examples are "**hydrocarbon substrate**" compositions "having the evolution of hydrogen sulfide therefrom inhibited", whereas applicant's claims recite "**molten sulfur**" compositions "having the evolution of hydrogen sulfide therefrom inhibited". **However**, applicant's claims are clearly **open** to the presence of **any** additional component, including hydrocarbons, given the use of the transitional phrase "comprising" (see related discussion in MPEP § 2111.03). Moreover, it is respectfully submitted that this different **preamble** language does not patentably distinguish the instant **composition** claims from those compositions clearly disclosed by Roof, given that, again, these Roof

compositions appear to contain all required components in appropriate amounts, with the first required component itself molten sulfur.

9. Claims 17 and 18 are rejected under 35 U.S.C. § 102(b) as anticipated by **or, in the alternative**, under 35 U.S.C. § 103(a) as obvious over Roof. Roof is relied upon as set forth immediately above, anticipating applicant's independent claim 11 (upon which claims 17 and 18 depend). Initially, it is again noted that instant claims 17 and 18 are in product-by-process form, reciting the manner in which "the scavenging agent was incorporated into the molten sulfur". It is again noted that the Roof inventive examples in Examples 2, 4, 6-8 and 11 show compositions which appear to contain **all** components as **required** by instant claims 17 and 18 (note that Roof clearly teaches molar ratios of scavenging agent to sulfhydryl compound ("proportional" or 1:1) falling within the scope of applicant's claim 17 range (see again col. 3, lines 63-65)). Thus, Roof may also be considered to **anticipate** instant claims 17 and 18, **or, in the alternative**, to have rendered compositions falling within their scope *prima facie* obvious, because:

> [E]ven though product-by-process claims are limited by and defined by the process, determination of patentability is based on the product itself. The patentability of a product does not depend on its method of production. If the product in the product-by-process claim is the same as or obvious from a product of the prior art, the claim is unpatentable even though the prior product was made by a different process. *In re Thorpe*, 777 F.2d 695, 698, 227 USPQ 964, 966 (Fed. Cir. 1985). (see MPEP 2113)

Alternatively then, if these Roof inventive examples fail in some way to meet the requirements of these two product-by-process claims, then, at the least, compositions falling within the scope thereof are considered to have been *prima facie* obvious, since it

would have been within the level of ordinary skill to have determined with minimum testing appropriate processes for making additional Roof compositions "having the evolution of hydrogen sulfide therefrom inhibited". It is noted that the injection method exemplified by Roof could be considered "physically mixed", per instant claim 17, and that Roof discusses the presence of H_2S in vapor phase above hydrocarbon substrate compositions (see col. 3, lines 43-65), in accordance with instant claim 18.

Response to Arguments

10. Applicant's remarks filed October 17, 2003 have been fully considered but are considered moot in view of the new ground(s) of rejection; it is respectfully submitted that applicant's arguments regarding **how** the instantly claimed H_2S scavengers function cannot be found convincing, given that, as reiterated *supra*, all instant claims are now drawn to **compositions**.

Conclusion

11. The prior art made of record and not relied upon is considered pertinent to applicant's disclosure. These references are considered cumulative to or less material than that discussed above and include those cited during prosecution of the parent application. The two newly cited Ledford et al. patents are similar to those cited in the parent application. Arnold et al. (US 2,530,561) were cited during prosecution of the application corresponding to Roof applied above, while Roof was cited during prosecution of the application corresponding to Forester et al. (US 6,242,618 B1).

Smith et al. (US 5,174,973) are discussed in WO 95/06616 (see sentence bridging pp. 3-4), cited by applicant; note that WO 95/06616 explicitly states that the gas-liquid contact apparatus of Smith et al. may be "modified for the removal of hydrogen sulfide and hydrogen polysulfides from liquid sulfur". Suzuki et al. teach methods of removing H_2S from gaseous mixtures utilizing, among other components, a dicarboxylic acid anhydride (see abstract; col. 3, lines 3-52); note that preferred anhydrides overlap in scope with those disclosed in applicant's paragraph **[0022]**. WO 97/29834 teaches processes for removing sulfur as a liquid during gas treating, wherein gaseous feed is contacted with a polar organic solvent, such as propylene carbonate (a carbonate within the scope of instant claim 16), in which melted sulfur is concentrated (see abstract; claim 21). Diaz (US 4,402,930) teaches that not only propylene carbonate, but also 2,4-pentanedione and 2,5-hexanedione (conjugated ketones within the scope of instant claim 15), are suitable absorbents having selectivity for H_2S in sulfur recovery processes (see abstract; col. 5, lines 9-27). Weers (US 5, 074,991) clearly teaches that the removal or suppression of H_2S from hydrocarbons or water is necessary because of its associated presence in vapor form (see abstract; BACKGROUND OF THE INVENTION section, noting especially col. 1, line 63, – col. 2, line 8), while Brogdon, Jr. et al. (US 2,941,868) teach that certain liquid sulfurs contain hydrocarbon impurities that may be removed by reacting same with a portion of the sulfur so as to form H_2S gas (see col. 1 in general, noting especially lines 64-72).

12. Any inquiry concerning this communication should be directed to Ardith E. Hertzog at telephone number is (571) 272-1347. The examiner can normally be reached on Monday through Friday (from about 8:00 a.m. - 4:30 p.m.).

13. If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Stanley S. Silverman, can be reached on (571) 272-1358. The fax phone number for the organization where this application is assigned is 703-872-9306.

14. Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. For any questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

STANLEY S. SILVERMAN
SUPERVISORY PATENT EXAMINER
TECHNOLOGY CENTER 1700

AEH
May 14, 2004